

DESCRIPTIONS OF ROCK UNITS PRESENT IN OUTCROP BENEATH DRIFT IN WAYNE COUNTY

Sources: Oil and gas logs, geological reports, and field notes

COLDWATER-SUNBURY FORMATIONS
(Early Mississippian)

These two formations are shown as a single unit because of difficulty separating them in the subsurface. In fact, either one or both may not extend into the county.

Coldwater Lithology: Dominantly shale, micaceous, blue, blue-gray to greenish gray in color becoming reddish and more sandy in upper part. Some reddish and purplish shale, though not widespread, near base of section. Occasional lenses or thin beds of dolomite, sandstone, or siltstone. In some areas interbedded shale and sandstone horizons appear but not widespread. Clay-ironstones appear to be distinctive (Wooten, 1951). Upper contact of Coldwater difficult to place because it grades upward in lithology and color into the basal beds of the Marshall Sandstone. According to Newcombe (1933) the change from Coldwater to Marshall may be indicated by presence of several varieties of micaceous minerals. Lower contact is recognized by the first definite dark brown to black shales of the underlying Sunbury Shale. Outcrop: Outcrop beneath glacial drift in county is extremely doubtful. No surface exposures.

Sunbury Lithology: Shale, hard, dark brown, dark gray to black, with traces of dolomite. Lithologically similar to the Antrim Shale but lacking the abundance of fossil plant spore cases. The Sunbury probably thickens to the north and northwest. Lower contact usually placed at first consistent appearance of the light-gray to blue shales, or the light gray, fine-grained sandstones of the underlying Berea formation. Thickness: If present, not more than 20 feet. Outcrop: Narrow band of doubtful extent beneath drift in westernmost Northville, Plymouth, and Canton townships. No surface exposures.

BEREA-BEDFORD FORMATIONS
(Mississippian and/or Devonian unassigned)

Berea Lithology: Sandstone and shale. Fine-grained, micaceous, white, gray, light drab to brown sandstone in beds of varying from 25-40 feet thick. Nearly everywhere separated by equal thicknesses of gray to blue-gray shales having sporadic zones of calcareous or dolomitic material. The sandstone is well-cemented but friable. Water-

bearing horizons are occasionally encountered. Lower contact with underlying Bedford is not easily recognized due to similarity of shale beds. Thickness: 0 to 60 feet. Outcrop: see below.

Bedford Lithology: Dominantly shale. Generally light gray, limey or sandy shale with sporadic dark gray horizons. Occasional micaceous sandstone and/or shaly dolomite or limestone. Lower contact of Bedford is usually placed at the first persistent appearance of the dark brown to black Antrim Shale. Thickness: 0 to 100 feet. Outcrop: Because the Berea-Bedford contact is difficult to recognize in the subsurface, the two formations are shown as a single unit. Outcrops beneath the drift in northwest and north-central parts of county. No exposures.

ANTRIM SHALE (Late Devonian)

Lithology: Mostly a dark brown to black bituminous shale. Finely laminated and fissile. Frequently described by water-well drillers as "black slate". Some gray shale may appear near base. Pyrite and/or marcasite nodules present throughout. Hard, black to brown, crystalline, and nearly spherical concretions are usually present in lower part. These concretions, composed of the mineral "anthraconite" (a petroliferous variety of calcium carbonate), often exceed 3 or 4 feet in diameter and may be mistakenly logged as limestone beds during drilling. An excellent outcrop revealing these concretions occurs at Kettle Point, Ontario. Also characterized by an abundance of very small, but visible, disc-like resinous and reddish-brown structures, identified as fossil spore cases of floating fossil plants. Lower contact of the Antrim is uncertain because basal gray beds resemble the blue-gray shales of the underlying Traverse Group. Thickness: 0 to 145 feet. Outcrop: Band of irregular width trending NE-SW in the northern one-third of the county. No exposures.

TRAVERSE GROUP (Middle Devonian)

Lithology: Shales, limestones, and dolomites not subdivided into separate formations in the subsurface. Shales are usually blue-gray to gray, occasionally brown, containing some thin calcareous or dolomitic beds. The limestone and dolomite beds have varying thicknesses and are occasionally cherty. Limestone



beds are light-gray, gray, or gray-brown, fine to coarse grained, high in calcium and at times so fossiliferous as to be called "shell limestone" by drillers. The dolomite beds are normally gray or buff. Ratio of carbonate rock to shale varies considerably, but gradually, from one area to another. Some logs show a dominance of shale over carbonate materials; others the opposite. Pyrite is common. The Traverse-Dundee contact in the subsurface can be difficult to recognize where limestones or dolomites of the Traverse rest upon similar beds of the underlying Dundee. In the Northville area, this contact is reasonably sharp. Thickness: 0 to 273 feet. Outcrop: Occurs as band of varying width trending northeast-southwest through middle of county. The nearest outcrop is in a quarry near Milan in Washtenaw County. No exposures in Wayne County.

DUNDEE LIMESTONE (*Middle Devonian*)

Lithology: Gray, buff to light-brown, cherty limestones and dolomites. Finely to coarsely crystalline. The 70-foot section in the quarry at Trenton consists of thin to massive, gray, buff, and bluish limestones containing cherty and siliceous beds, secondary calcite, and fossiliferous zones. Carbonaceous partings between beds. Cavities containing hydrocarbons are common. Frosted quartz sand abundant in basal beds. The lower contact, when resting on limestones of the underlying Detroit River Group, can be difficult to recognize. Thickness: 0 to 152 feet. Outcrop: A very broad band trending northeast-southwest within the southeast half of the county. Exposed at Sibley Quarry in Trenton.

DETROIT RIVER GROUP (*Middle Devonian*)

Where exposed at surface in the southeast Michigan and northern Ohio, this group has been subdivided (top to bottom) into the Anderdon, Lucas, Amherstburg, and Sylvania formations (Ehlers, Stumm, and Kesling, 1951). With the exception of the Sylvania Sandstone, the other formations are difficult to subdivide in the subsurface, hence shown as a single unit, Detroit River dolomites, on Plate 1.

Lithology: Mostly dolomite, occasionally argillaceous and/or cherty. Gray, buff, light-brown, or white. Finely crystalline to granular. The Anderdon, mostly a high calcium limestone, 20 to 30 feet thick, cannot always be differentiated from the overlying Dundee Limestone. Cavities of irregular shape and size are common. Many contain calcite crystals up to four inches long in a form known as "dogtooth spar". Anhydrite, particularly in the Lucas Formation, occurs in localized lenses or thin beds. The basal

beds contain an increased amount of frosted quartz sand grains similar to those in the Sylvania Sandstone. The lower contact is placed at the first persistent appearance of sandstone or dolomitic sandstone of the underlying Sylvania. Thickness: 0 to 300 feet. Outcrop: Prominent east-west band in southern part of county. Uppermost beds are exposed along floor at Sibley Quarry. Formerly exposed at south end of Grosse Ile.

SYLVANIA SANDSTONE (*Middle Devonian*) Basal formation of Detroit River Group

Lithology: A white to light gray, cross-bedded, fine- to medium-grained, high purity, quartz sandstone. Grains are frosted, sub-angular to rounded and usually poorly cemented. The formation is extremely friable upon exposure to weathering and, when washed and screened, resembles granular sugar. Cavities lined or filled with calcite and/or celestite crystals are common. Down dip toward the center of the Michigan basin, changes to a sequence of sandy dolomites, dolomitic sandstones, and sandstones. Where the upper beds consist of sandy dolomite, differentiation from the basal beds of the overlying Detroit River Group becomes difficult. Basal beds of the Sylvania rest unconformably on the Bois Blanc Formation, and on the Raisin River Dolomite of the Bass Islands Group. In Ohio, the basal beds of the Sylvania Sandstone contain pebbles derived from the underlying Raisin River Dolomite of Silurian age. The Sylvania is oldest formation outcropping immediately beneath the glacial overburden in Wayne County. Thickness: 0 to 250 feet. Outcrop: Flat Rock, Michigan.

BOIS BLANC FORMATION (*Middle Devonian*)

Lithology: Chert-rich dolomite. Dense to finely crystalline. Gray, white, or buff to brown. Upper contact is an erosional unconformity with an unusual amount of weathered chert. The lower contact with the underlying Bass Islands Group is also marked by an erosional unconformity. Thickness: 28 to 44 feet. Outcrop: Not known.

BASS ISLANDS GROUP (*Late Silurian*)

Lithology: Consists of the Raisin River and Put-in-Bay (older) dolomites, usually undivided in the subsurface. Dense to finely crystalline. Light-gray to brown, but some zones are dark gray and/or dark brown. Occasional thin distinct beds, lenses or stringers of chert and anhydrite. Some shales, dolomitic shales, and shaly dolomites with anhydrite generally appear near base. Contact with the underlying Salina Group is very difficult to identify. Thickness: 220-350 feet. Outcrop: Not known.

SALINA GROUP (*Late Silurian*)

Lithology: A thick section of alternating sequence of carbonates, shaly carbonates, shales and evaporites. The carbonate rocks are essentially dolomite, or shaly dolomite, with occasional limestone. Generally gray and buff-brown to brown. Dense to coarsely crystalline. Some beds characterized by high porosities. Occasional dolomite breccia. The evaporite rocks are primarily salt but appreciable amounts of anhydrite and some gypsum also present. Salt beds vary in thickness from a few feet up to 330 feet. The salt is usually white, though some beds are clear and transparent; others are brown or reddish. The anhydrite is mostly white or tan, occasionally pink, and frequently containing dark streaks or bands. Aggregate thickness of salt beds in Wayne County ranges from 430 to 730 feet. The fine-grained clastics are largely shales, dolomitic shales, with minor amounts of sand. Shales are generally gray to dark gray, but some are brown. In general, the upper half of the Salina sequence is a shale, carbonate, evaporite lithology changing to a dominant carbonate lithology in the bottom third. However, this may not persist areally. Contact with the underlying Niagaran is not easily recognized in the subsurface but could be placed below the last known occurrence of salt and anhydrite. Thickness: 1132 to 1490 (?) feet. Outcrop: Not known.

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